

## ABSTRACT

An improved system and method for communicating information on a transmission medium is disclosed. The disclosed system and method provide improved communications on the transmission medium in the presence of interference, which may take the form of uncorrelated interference from different services on neighboring transmission mediums. In one embodiment, the communications system includes a subscriber modem, a central office modem; and a communications channel coupled between the subscriber modem and the central office modem. The communications channel transports uplink signals from the subscriber modem to the central office modem, and downlink signals from the central office modem to the subscriber modem. At frequencies below a selected frequency  $M_{E2F}$ , the power spectral density of the transmitted uplink signals is proportional to the power spectral density of the transmitted downlink signals by a positive scale factor, and at frequencies above  $M_{E2F}$ , the power spectral density of the uplink signals is limited to one or more uplink frequency bands and the power spectral density of the downlink signals is limited to one or more downlink frequency bands that are disjoint from the uplink frequency bands. Preferably, the total bandwidth of the uplink frequency bands above  $M_{E2F}$  is proportional to the total bandwidth of the downlink frequency bands above  $M_{E2F}$  by the same positive scale factor.